ELEC 569 / PHYS 569 Web Central

NOTE: PowerPoint and PDF files can be downloaded from Rice domains only.

General Information

This class deals with the field of ultrafast optical phenomena. There is no required text; the following topics will be covered:

- Electromagnetic propagation in the presence of gain
- Laser oscillation and cavities
- Ray optics
- Pulse propagation
- Non-linear optical phenomena
- Kerr-lens mode locking
- Short pulse measurement
- Ultrafast techniques

Class Room: **Brockman 103**
Class Time: TuTh 2:30 - 3:50
Office hours: Tuesdays, 1:00-2:30

- **Prerequisites:** It is assumed that you have had some exposure to E&M, at the level of an advanced undergraduate course. Knowledge of quantum mechanics is helpful but not required. Undergraduates who are interested in taking this class should contact Dr. Mittleman to discuss these issues.
- **Assignments:** Problem sets are occasional. One of the important aspects of this class are the student presentations, which occur towards the end of the semester. This will be discussed during the first day of lecture.
- **Attendance:** Lecture attendance is REQUIRED. If there is one way to guarantee that you do NOT get an A in this class, it is to fail to attend lecture.

Announcements

- Student presentations begin on Thursday March 27.

Lectures will be posted here in the form of PDF files. This is intended to save you the trouble of copying everything down during lectures. Take advantage of this.

- Lecture 1
- Lecture 2
- Lecture 3

- Lecture 4
- Lecture 5
- Lecture 6
- Lecture 7
- Lecture 8
- Lecture 9
- Lecture 10
- Lecture 11
- Lecture 12
- Lecture 13
- Lecture 14
- Lecture 15
- Lecture 16

Other documents

- Required reading for all experimental optics people: How to clean your optics

Interesting Links

- Optical Society of America (OSA) - contains links to web pages for the OSA Annual Meeting, the Optical Fiber Conference, and CLEO/QELS. Also links to all of the OSA journals including JOSA and Optics Letters. Student memberships available, and check out the new Rice student chapter.
- IEEE Photonics Society - co-sponsors of the CLEO/QELS meeting and OFC. Student memberships available.
- American Physical Society Division of Laser Science (APS - DLS) - student memberships available.
- The FROG home page

Students

- Boominathan, Vivek - "Femtosecond holography" - LINK - March 27
- Chipara, Alin Cristian - "Construction of a femtosecond laser microsurgery system" - LINK - March 27
- Choe, Jesse - "An ultrafast terahertz scanning tunnelling microscope" - LINK - March 27
- Flores, Luis - "Femto-photography: capturing and visualizing the propagation of light" - LINK - April 1
- Jiang, Chen - "Controlling ripples' periodicity using temporally delayed femtosecond laser double pulses" - LINK - April 1
- Kabbani, Mohamad - "Femtosecond optical reflectivity measurements of lattice-mediated spin repulsions in photoexcited LaCoO3 thin films" LINK - April 8
- Kataria, Himanshu - "Nonlinear laser lithography for indefinitely large-area nanostructuring with femtosecond pulses" - LINK - April 8
- Keyshar, Kunttal - "Femtosecond laser ablation of highly oriented pyrolytic graphite: a green route for large-scale production of porous graphene and graphene quantum dots" - LINK - April 8
- Langin, Thomas - "Ultrafast all-optical shutter based on two-photon absorption" - LINK - April 10
- Wang, Ye - "Femtosecond laser assisted etching of quartz: microstructuring from inside" - LINK - April 10
- MacInnes, Andrew - "Miniature Optical Atomic Clock: Stabilization of a Kerr Comb Oscillator" -

LINK - April 10

- Melvin, Paul - "Ultrashort Pulse Propagation through a Strongly Scattering Medium: Simulation & Experiments" - LINK - April 15
- Miranda, Andrea "Influence of Acceptor Structure on Barriers to Charge Separation in Organic Photovoltaic Materials" - LINK - April 15
- Poulsen, Aslak - "Femtosecond to attosecond light pulses from a molecular modulator" - LINK - April 17
- Qian, Zihao - "Nonlinear chirp effect introduced by Kerr medium as optical switches in ultrafast time-resolved measurements" - LINK - April 17
- Salazar, Eric - "Materials processing: Two-photon fabrication" - LINK - April 15
- Sewell, Cody - "Nonlinear broadband photoluminescence of graphene induced by femtosecond laser irradiation" - LINK - April 22
- Lou, Minhan - "Femtosecond Modification of Electron Localization and Transfer of Angular Momentum in Nickel" - LINK - April 22
- Zhang, Chao - "Ultrafast Photoinduced Charge Separation in Metal–Semiconductor Nanohybrids" - LINK - April 22
- Zhang, Cheng - "Femtosecond laser-induced stimulation of a single neuron in a neuronal network" - LINK - April 24
- Zhou, Zhou - "Femtosecond laser micromachining in transparent materials" LINK - April 24
- Zubair, Ahmed - "Sequential Femtosecond X-ray Imaging" - LINK - April 24

Contact Dr. Mittleman.

Back to home page